CLAIMS

1. A method for producing acetic acid, comprising the steps of:

continuously reacting methanol with carbon monoxide in the presence of a rhodium catalyst, an iodide salt, methyl iodide, methyl acetate, and water; and

thereby producing acetic acid at a production rate of 11 mol/L·hr or more while keeping the acetaldehyde content of a reaction mixture to 500 ppm or less,

wherein the reaction is carried out at a carbon monoxide partial pressure in a gaseous phase of a reactor of 1.05 MPa or more and/or at a methyl acetate content of the reaction mixture of 2 percent by weight or more to thereby keep the production rate of acetaldehyde to 1/1500 or less of the production rate of acetic acid.

2. The method according to Claim 1, wherein the reaction is carried out at a hydrogen partial pressure in the gaseous phase of the reactor of 100 kPa or less.

3. The method according to Claim 1, wherein the reaction is carried out at a hydrogen partial pressure in the gaseous phase of the reactor of 70 kPa or less.

4. The method according to Claim 1, wherein the reaction is carried out at a hydrogen partial pressure in the gaseous phase of the reactor of 70 kPa or less and a methyl acetate content of the reaction mixture of 3.1 percent by weight or more.

5. The method according to any one of Claims 1 to 4, wherein the reaction is carried out at a water content of the reaction mixture of 3 percent by weight or less.

6. The method according to any one of Claims 1 to 5, wherein acetic acid is produced at a production rate of 15 mol/L·hr or more.

7. The method according to any one of Claims 1 to 6, wherein the production rate of acetaldehyde is kept to 1/2500 or less of the production rate of acetic acid.

8. The method according to any one of Claims 1 to 7, further comprising a purification process which comprises the steps of:

separating the reaction mixture into acetic acid and a process mixture comprising residual components and recovering acetic acid;

separating and removing carbonyl impurities from the

process mixture; and

recycling the residual process mixture to the reactor.

9. The method according to any one of Claims 1 to 7, further comprising a purification process which comprises the steps of:

(A) separating the reaction mixture into a volatile component and a low-volatile component by distillation, the volatile component comprising acetic acid, water, methyl acetate, and methyl iodide, and the low-volatile component comprising the rhodium catalyst and the iodide salt;

(B) separating the volatile component into a high-boiling component and a low-boiling component by distillation, the high-boiling component comprising acetic acid, and the low-boiling component comprising water, methyl acetate, and methyl iodide;

(C) recycling the low-volatile component to the reactor;

(D) separating and removing carbonyl impurities from the low-boiling component obtained in Step (B) to yield a residual component;

(E) recycling the residual component obtained in Step (D) to the reactor;

(F) separating acetic acid from the high-boiling component obtained in Step (B) by distillation; and

(G) treating the acetic acid obtained in Step (F) with a silver- or mercury-exchanged cation exchange resin.

10. The method according to Claim 9, wherein Steps (B), (D), and (F) are carried out using a total of three or less distillation columns.